ICCE 2010

Shanghai, China

June 30 - July 5, 2010

32nd International Conference on Coastal Engineering

Book of Abstracts

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The 32nd International Conference on Coastal Engineering (ICCE 2010)

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Prepared and Published
By the ICCE 2010 Local Organizing Committee

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32nd International Conference on Coastal Engineering
June 30 --- July 5, 2010, Shanghai, China

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Foreword

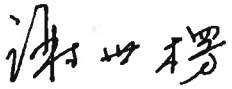
The 32nd International Conference on Coastal Engineering (ICCE 2010), which will be convened on June 30 to July 5, 2010, in Shanghai, is the first of its kind ever held in the mainland of China. Delegates from 46 countries will gather in this great event.

A total of 725 papers were submitted. After review jointly by Technical Paper Review Committee (TPRC), Coastal Engineering Research Council (CERC) and the Local Organizing Committee (LOC) of ICCE 2010, the abstracts-in-depth of 436 papers and 55 posters have been selected for inclusion in this Book of Abstracts.

With the rapid development of science and technology in recent years, much progress has been made in the basic theory, computational methodology and data processing approaches in coastal engineering studies; the understanding of various physical phenomena in coasts and seas has been deepened; and the relationship among various disciplines has become much closer. The accepted papers and posters cover the science and technology relating to planning, design, management and construction for coastal protection, estuary training and port engineering, including topics on wave; swash, nearshore currents and long waves; coastal management, risk and environmental restoration; sediment transport and morphology; and coastal structure. Interdisciplinary topics, covering more than three sub-disciplines, number quite a few, leading to the understanding that scientists of today and in the future need a more comprehensive and integrated ability to handle various problems. This conference will surely help to broaden the vision of coastal researchers and engineers, trigger new approaches and concepts, and promote the development of coastal engineering studies, which is the very goal of ICCE conferences.

We wish to express our sincere thanks to the organizer and hosting institutions of ICCE 2010 for their hard work to ensure the success of the conference; thanks also to the sponsoring and supporting institutions and exhibitors for their strong support of and active participation in the conference. We believe that delegates from all over the world will enjoy their participation in ICCE 2010 both academically and culturally.

May ICCE 2010 be a great success!



Xie Shileng
Chairman, LOC
ICCE 2010

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CONSTRUCTION OF TWO NEW BREAKWATERS AT OSTEND LEADING TO AN IMPROVED HARBOUR ACCESS

Hadewych Verhaeghe, Ministry of the Flemish Community, Coastal Division, hadewych.verhaeghe@mow.vlaanderen.be
Luc Van Damme, Ministry of the Flemish Community, Coastal Division, luc.vandamme@mow.vlaanderen.be
Jan Goemaere, Ministry of the Flemish Community, Coastal Division, jan.goemaere@mow.vlaanderen.be
Julien De Rouck, Ghent University, Department of Civil Engineering, julien.derouck@ugent.be
Wim Van Alboom, SECO, International Department, w.van_alboom@seco.be

INTRODUCTION

Ostend is situated in the middle of the Belgian coastline. Although for many centuries Ostend was one of the most important ports at the Southern North Sea, it has a relatively small harbour. In order to make the harbour accessible for ships with a length up to 200m, important modification works of the harbour access are necessary. Studies have led to a new design of the harbour access in which the old (curved) access defined by two wooden piers is replaced by a new access channel perpendicular to the coast line together with the construction of two breakwaters (Figure 1).

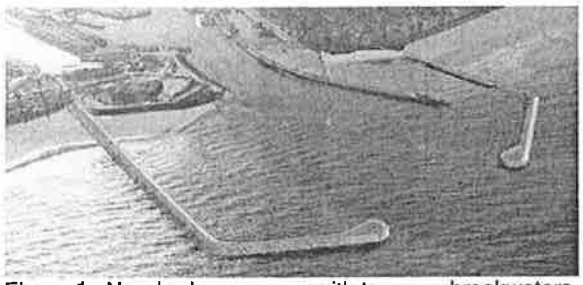

Figure 1 - New harbour access with two new breakwaters

DESIGN OF THE NEW HARBOUR ENTRANCE WITH TWO NEW BREAKWATERS

A first preliminary design of a new harbour entrance was made in 1999. Several years of procedures later, in May 2007, the first works to realise the new harbour access started with the demolition of the eastern pier and the construction of a low (i.e. during high tide submerged) eastern breakwater which will be incorporated then in the final Eastern breakwater.

During the design process of the new harbour access, many studies have been performed to find the 'best' lay-out of the breakwaters and access channel. Nautical as well as morphological aspects have been considered.

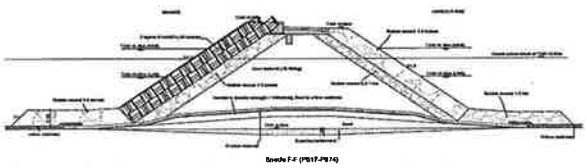

Figure 2 - Cross section of the Western breakwater

The cross-sections of the breakwaters are designed for the 100 year storm. In Figure 2 a typical cross-section is shown. The corresponding design characteristics are H_s = 4.8m, T_p = 10.6s and water level TAW +6.8m. An average bottom level is situated at TAW -7.0m. The armour layer at sea side consists of 2 layers of HAROs (15 tonnes), the armour layer at the lea side consists of 3-6 tonnes armour stone.

Underneath a large part of the Western breakwater thick layers of silt were detected. Typically the stable sand layer starts only at TAW -16m to TAW -18m. For economical reasons, the use of a very strong geotextile was opted for to design a stable breakwater. The geotextile has a tensile strength >1600kN/m in transverse direction of the breakwater, and > 100kN/m in the direction of the breakwater. During construction settlements up to 1m are expected in the middle of the breakwater. To take this into account, an extra layer of gravel of 1m is placed on the sea bottom. Further, to allow the soil to drain, a construction break of 6 to 8 months at a level of TAW +3m will be taken into account.

REALISATION AND FUTURE PLANNING

During the dredging of the new access channel, bombs and mines aging from the two World Wars were found. Careful removal of these objects was necessary. The new access channel came into use in February 2010.

During summer 2009 the placing of the first willow mattresses and the prefabrication of the first HARO blocks started. Each HARO is 1.68m high and has a weight of 15 tonnes. In total approximately 8.000 HAROs are necessary. Construction works at the Eastern breakwater, with placement of the first HAROs, are shown in Figure 3. The construction of both eastern and western breakwater will be finished in 2012.

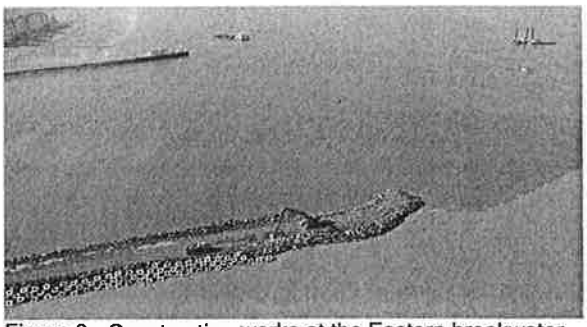

Figure 3 - Construction works at the Eastern breakwater

The paper will describe in detail the design process of the improved harbour access including all aspects taken into account. Further the realisation of the breakwaters and access channel will be treated.